

REMARKS

The Official Action mailed September 15, 2006 has been carefully considered. Reconsideration and allowance of the subject application, as amended, are respectfully requested. Claims 1 and 13 have been amended to overcome the Examiner's formal rejections thereto, and claims 2, 4 and 9-12 have been cancelled, without prejudice. No new matter has been entered as a result of the changes made herein.

The Examiner's statement regarding the priority claim of the present application is noted.

Turning to the rejections on the art, claims 1-13 and 15 stand rejected under 35 UC § 103 as being unpatentable over Leppo et al in view of Johnson, Jr. et al. and NC802 data sheet. Applicants respectfully submit this rejection is in error.

As an initial matter, Applicants' invention of independent claim 1 has been extensively amended to set forth the limitations of the various signals used by the wake up circuit to control the battery charging switch to enter an intermediate conduction state, a full conduction state or an off state. In particular, it is noted that claim 1 requires "a second programmable signal representative of a predetermined wake up current level, ...wherein said comparison output signal comprises an analog signal, said switch responsive to said analog signal to enter an intermediate conduction state to provide a current level to said battery representative of said predetermined wake up current level; and wherein said selector signal comprises a first state and a second state, said switch is responsive to said first state to enter a full conduction state and responsive to said second state to turn off said switch." (Claim 1, as amended).

The examiner points to Leppo et al. as disclosing "a comparison circuit 85 configured to receive a first signal representative of a charging current level [see fig. 3; column 5, lines 57-59] provided to a battery via a path/power bus 90 and a second signal representative of a predetermined wake up current level V_{BatLow} [see fig. 3; column 5, lines 57-59] and to provide a comparison output signal in response to said first and second signals [see column 5, lines 59-67] (Page 3, Official Action).

However, Applicants respectfully disagree with the Examiner's characterization of the Leppo reference. It is Applicants' understanding of the Leppo reference that the comparator 85 is provided as a low main battery power warning system (see column 5, lines 52-53). Furthermore,

it is Applicants' understanding that the signal V_{BatLow} is not a predetermined wake up signal; it is simply a threshold signal indicative of a low battery condition. Also, the output of comparator 85 is not used to control the conduction state of a charging switch to limit the charging current, rather, the output is used by circuit 55 to perform a power down or enter into a suspend mode (see column 5, lines 51-67). Also, the Examiner, at page 4 of the Official Action, asserts that Leppo et al. teaches "an output decision circuit 80 configured to receive at least said comparison output signal [see fig. 3] to a switch 71 to control a state of said switch, ..." It is Applicants' understanding that this assertion of Leppo is not correct. Instead, as noted above, and as described in Leppo et al., the output of comparison 85 is provided to circuit 55 (not circuit 80) to allow circuit 55 to perform a power down or enter to a suspend mode. Moreover, nowhere does Leppo et al. disclose that the output of comparator 85 is used to control switch 71 (shown in figure 3).

The Examiner concedes that Leppo does not disclose a selector signal from a selector circuit, but points to Johnson as disclosing, in figures 2-4, a selector circuit 20 that includes trickle charge control to facilitate low-current charging for cells with voltages below their predetermined operating thresholds, i.e., deeply discharged [see fig. 2; column 2, lines 40-43].

As an initial matter, the selector signal as required by Applicants' invention of independent claim 1 is used to control the battery switch to enter a full conduction state or an off state, not a trickle charge state as alluded to by the Examiner. Rather, the output of the comparison circuit is used by the output decision circuit (part of the wake-up circuit as per claim 1) to control the battery charging switch to enter into an intermediate conduction mode to controllably provide a lower level of charging current to the battery.

Moreover, it is Applicants' understanding that the teachings of Johnson are directed to a battery trickle charging circuit that includes fixed components that are operable to control the battery charging switch 2. For example, as shown in figure 3, a current limited by the resistor 33 is used to control switch 2 during a trickle charge mode. However, as the Examiner can appreciate, once the value of the resistor 33 is fixed into the circuit depicted in figure 3, that value cannot be changed to accommodate, for example, other battery types or general restrictions such as maximum power dissipation. In contrast, Applicants' invention of independent claim 1

requires a programmable signal representative of a predetermined wake up current level as one of the control signals to control the conduction state of the battery charging switch during an intermediate conduction mode. As described in Applicants' specification at page 27, a programmable current level may be used to account for varying battery sizes, types and charging conditions (lines 1-2).

Finally, it is noted that the Examiner relies on the NCP802 data sheet for the limitations found in claim 5.

However, none of the aforementioned references relied upon by the Examiner disclose or suggest all of the limitations found in claim 1, as amended. Furthermore, the limitations provided by Applicants' invention of independent claim 1 can be used to achieve results not contemplated by these references. For example, as alluded to above, using a programmable signal representative of a predetermined wake up current level may offer the enhanced ability to accommodate trickle charging for varying battery sizes, types and charging conditions. Applicants' invention of independent method claim 13 has also been extensively amended, and includes limitations that are similar to the limitations found in claim 1. Accordingly, the comments set forth above regarding the invention of independent claim 1 may also be directed to the invention of independent claim 13.

Accordingly, it is respectfully submitted that the Examiner's rejection of claims 1-13 and 15 under 35 USC § 103 as being unpatentable over Leppo et al. in view of Johnson, Jr. et al. and NCP802 data sheet is in error, and should be withdrawn.

Claims 1-4, 6, 9-13 and 15 stand rejected under 35 USC § 103 as being unpatentable over JP-11164489 in view of JP-08140281. Applicants respectfully submit this rejection is also in error.

Similar to the arguments adduced above regarding the Leppo et al., Johnson, Jr. et al. and the NCP802 data sheet, these two Japanese references relied upon by the Examiner appear to be lacking in all of the features required by Applicants' invention of independent claims 1 and 13. Specifically, it appears that these two Japanese references teach a simplistic form of current control that do not utilize the signal types required by claims 1 and 13. Accordingly, it is respectfully submitted that since these specific signal types and the advantages attributed thereto

are not disclosed or suggested in the Japanese references relied upon by the Examiner, it is respectfully submitted that these references cannot be used to achieve or render obvious Applicants' claimed invention.

Accordingly, it is respectfully submitted that the Examiner's rejection of claims 1-4, 6, 9-13 and 15 under 35 USC § 103 as being unpatentable over JP-11164489 in view of JP-08140281 is in error, and should be withdrawn.

Having dealt with all the objections raised by the Examiner, it is respectfully submitted that the present application, as amended, is in condition for allowance. Thus, early allowance is earnestly solicited.

If the Examiner desires personal contact for further disposition of this case, the Examiner is invited to call the undersigned Attorney at 603.668.6560.

In the event there are any fees due, please charge them to our Deposit Account No. 50-2121.

Respectfully submitted,
Bucur et al.

By their Representatives,

Grossman, Tucker, Perreault & Pflieger, PLLC
55 South Commercial Street
Manchester, NH 03101
603-668-6560

By: /Edmund P. Pflieger/
Edmund P. Pflieger
Reg. No. 41,252